

Remote emissions sensing of the Jakarta fleet

BACKGROUND

Motor vehicles contribute significantly to poor air quality in Jakarta, Indonesia. There is currently a lack of understanding of the real-world emissions of the Jakarta vehicle fleet and whether existing regulations and policies are delivering the expected improvements in emissions performance. To provide insights into these questions, The Real Urban Emissions (TRUE) Initiative, in partnership with Bandung Institute of Technology (ITB) and supported by Badan Pengatur Jalan Tol (BPJT), carried out a first-of-its-kind vehicle emissions testing study in the Greater Jakarta Region. Analysis of the data collected is intended to provide evidence and support for future actions to address the impacts of motor vehicles on air quality and health.

KEY FINDINGS

- For gasoline passenger vehicles, the implementation of Euro 2 emission led to significant reductions in tailpipe emissions from gasoline passenger vehicles. For Euro 2 certified vehicles measured during this study, nitrogen oxides (NO_x) emissions were 94% lower, carbon monoxide (CO) emissions were 77% lower, and hydrocarbon (HC) emissions were 72% lower than the emissions from pre-2007 model year vehicles. Further reductions of 58% for median NO_x emissions and 49% for median CO emissions were observed for this vehicle group with the introduction of Euro 4 standards in 2018.
- Relative to gasoline models, the implementation of Euro 2 standards for diesel passenger vehicles resulted in more modest emissions decreases—45% for NO_x, 25% for CO, and 18% for HC. Median NO_x emissions from Euro 2 diesel passenger vehicles were 8 to 19 times the emissions of gasoline versions produced in the same year. The NO_x emissions of Euro 2 diesel passenger vehicles are approximately 7 times higher than those from gasoline models certified to Euro 2 standards.
- Buses, heavy-duty trucks, and light-duty trucks, which typically use diesel engines, had the highest median NO_x emissions measured during the study. The median fuel-specific NO_x emissions from heavy- and light-duty trucks were 13 to 14 times the emissions of private passenger vehicles and taxis, where gasoline engines are the most common fuel source. Less variation was observed in the median CO and HC emissions across vehicle types.
- The results indicate that only a modest improvement in diesel truck emissions was achieved in the past decade. For diesel heavy- and light-duty trucks certified to Euro2/II standards, the median NO_x, CO, and HC emissions were 15%–24%, 18%–21%, and 23% lower, respectively, than those of pre-Euro 2/II vehicles. Although some improvement in median NO_x emissions is observed with the introduction of Euro II standards, the magnitude of emissions remains quite high and well above the level that can be achieved with modern diesel exhaust aftertreatment systems.

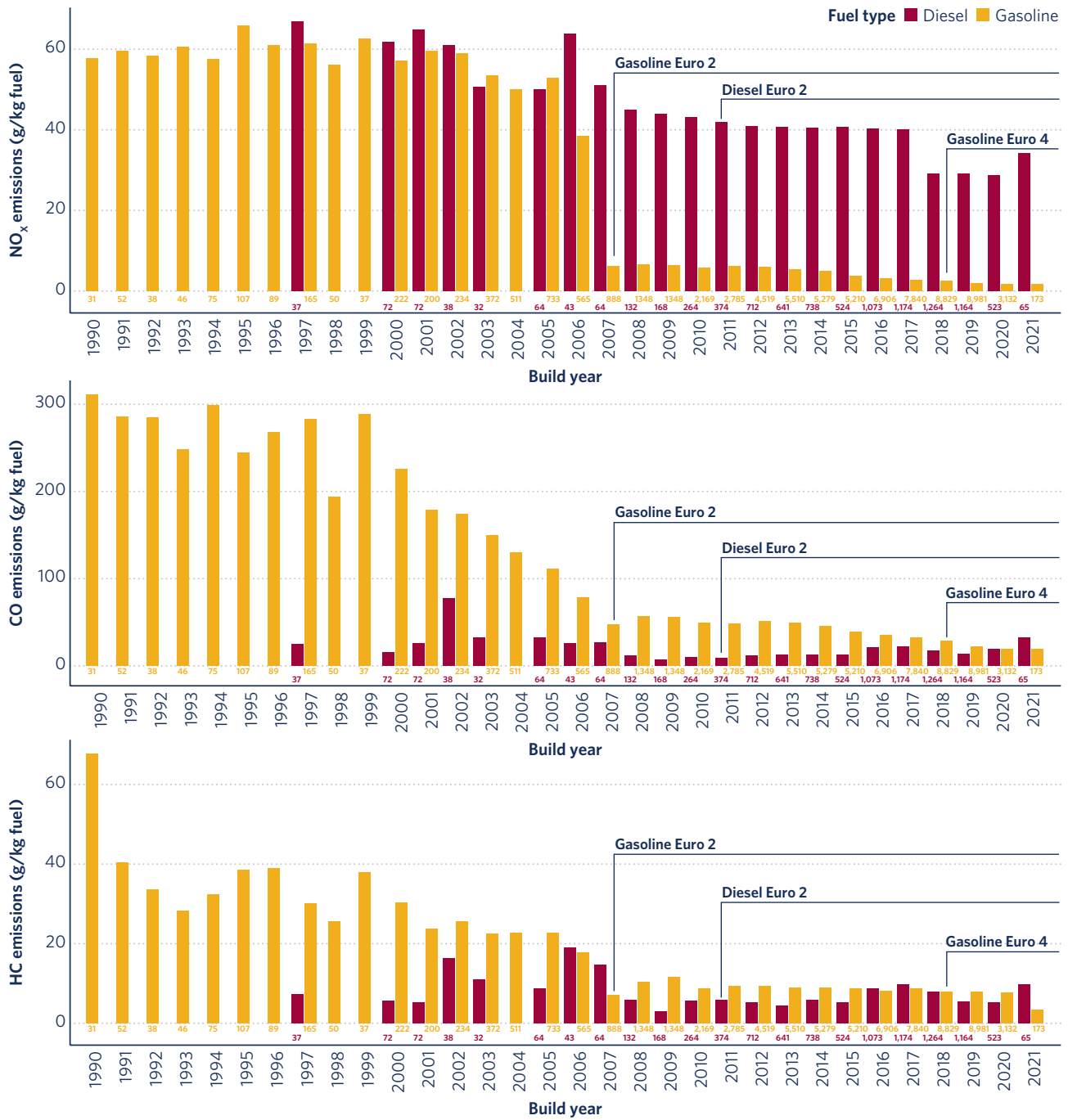


Figure 1. Median NO_x, CO, and HC emissions of passenger vehicles by fuel type and build year.

To address emissions from vehicles, policymakers should consider the following:

- To address elevated NO_x emissions from diesel vehicles and to continue to improve the real-world emissions performance across all vehicle types, Indonesia should work to implement Euro 6/VI emission standards. This will ensure that best-available emissions control technologies are made available for new vehicles and engines. Importantly, fuel quality standards will need to match this ambition and plans for making ultra-low sulfur fuels widely available should also be developed.
- Further development of Jakarta’s low emission zone policy would benefit from setting restrictions for vehicle

groups with the highest demonstrated real-world emissions, including pre-Euro 2 gasoline passenger cars and all diesel passenger cars. If future expansions of Jakarta low emission zones do not restrict goods movement vehicles, as is the case now, we recommend that only Euro 6/VI or zero-emission light- and heavy-duty trucks be allowed into these zones.

- Recommended actions to support the improved emissions performance of buses operating in Jakarta include requiring fleet operators to purchase buses that meet Euro VI emissions standards, tightening inspection and maintenance requirements, and accelerating the transition to zero-emission electric buses.

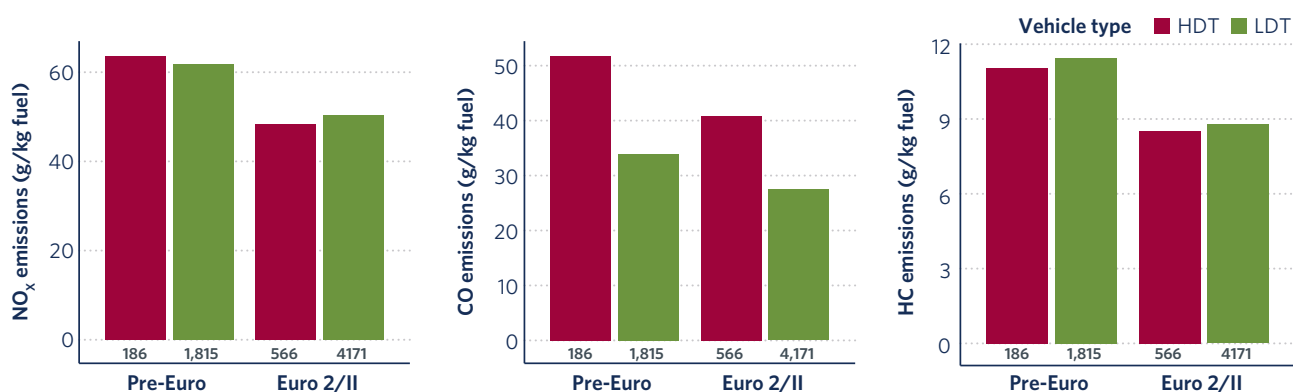


Figure 2. Median NO_x, CO, and HC emissions of diesel heavy-duty trucks (HDTs) and light-duty trucks (LDTs) by emission standard.



TO FIND OUT MORE

For details on the Jakarta remote-sensing project and related questions, contact Tim Dallmann, t.dallmann@theicct.org.

For more information on TRUE, visit www.trueinitiative.org